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ABSTRACT

Designed to present interesting facts about science and to heighten the curiosity of primary age students, this book contains activities about the natural world and numerous black and white illustrations. The activities focus on familiar animals that are found in the air, on land, and in the water. A duckling named Little Mac Mallard introduces the learning games, fill-ins, songs, and experiments which center on animal characteristics and behaviors. Directives for the individual activities are provided in the teacher/parent guide section and include: (1) discussion questions; (2) explanations of the learning activities with an answer key; (3) vocabulary list; and in most cases (4) extended activities. (ML)

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A GOOD APPLE ACTIVITY BOOK FOR PRIMARY GRADES

GOOD APPLE

YOUNG SCIENTISTS EXPLORE

Air, Land, & Water Life

ED280689

BOOK 3 PRIMARY LEVEL

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By Linda Penn Illustrated by Elaine Scott

YOUNG SCIENTISTS EXPLORE

AIR, LAND, & WATER LIFE

BOOK 3 - PRIMARY LEVEL

by

LINDA PENN

illustrated by **ELAINE SCOTT**

cover by **TOM SJOERDSMA**

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PREFACE

In the lives of young children, very often science is considered subject matter for more mature years. If we allow this attitude to prevail, as parents and educators we will be wasting an important learning tool--the young child's natural curiosity about living things.

It is the intent of this book, **Young Scientists Explore Air, Land, & Water Life,** to introduce young minds to "real" scientific facts concerning familiar animals. This interesting information will not only be approached understandably with learning games, fill-ins and songs, but also will involve the children in "Science Sampler" experiments. Their primary objective will be further clarification of ideas presented through "hands-on" experiences. Many additional suggestions are included in the Teacher/Parent Guide in the back of the book. It is not necessary to employ every idea to broaden the children's understanding of the subject, but to pick those that will fit into the time and circumstances of the classroom or home situation. The objective was to provide a more than adequate choice of learning activities.

A downy duckling named Little Mac Mallard will introduce the various activity pages. As the duckling grows pictorially throughout the book, so will the children's awareness of birds, fish and other animals. The suggested activities are readily accomplished, yet highly motivated toward learning information thoroughly. The knowledge gained should trigger recognition of interesting animal characteristics in everyday environments. Young children's innate curiosity will definitely be stimulated toward further explorations.

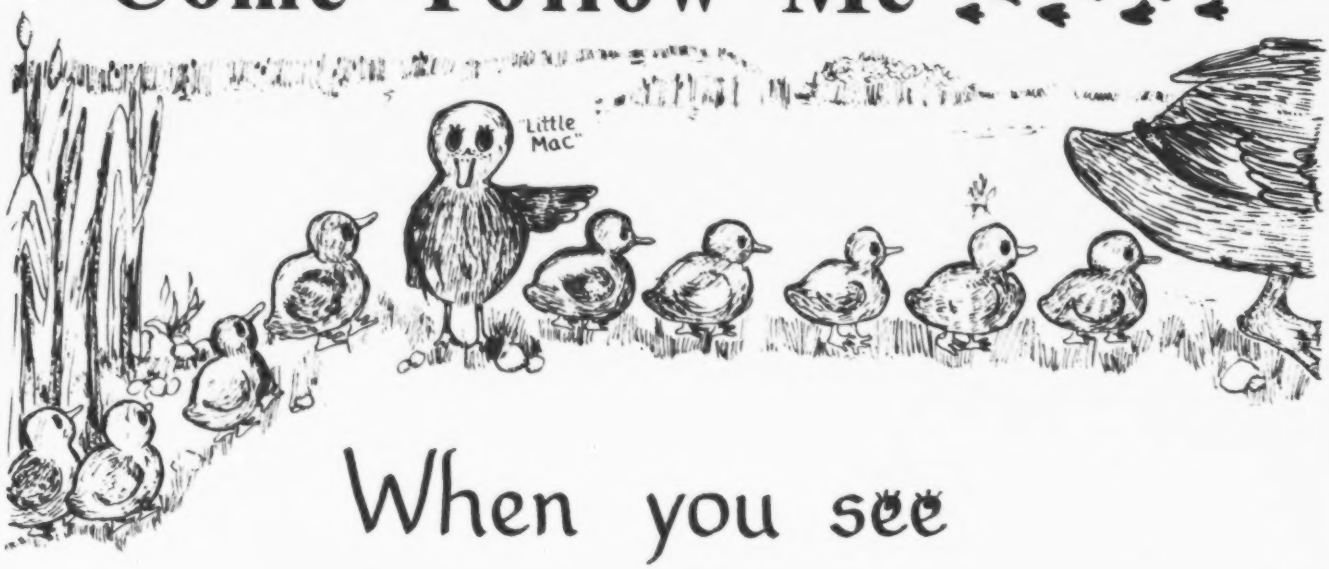
The approach is simple; the subject fascinating, yet familiar; and the potential for learning unlimited. How lucky we are to share the wonders of air, land, and water life with the young!

Sincerely,

Linda Penn

Mac"
Quack!
Peep!
Duckling
Peep!
Peep!
Hellos!

Come Follow Me



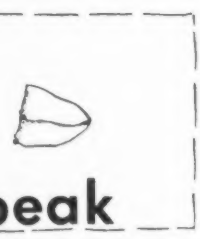
When you see
mother mallard duck.
I'm always close behind.
Come follow us, so
you can meet some
feathered friends
of mine.

Feathered Friend Fill-In

These _____ friends
are known as _____.
Each has two _____
and _____;
a pair of _____ to
look for food;
a special _____ to eat.

birds

feathered


beak

eyes

feet

wings

Puzzling Parts ??

Owl

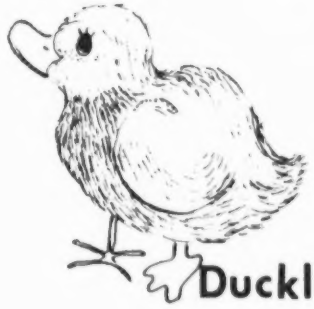
Eagle

Woodpecker

Hummingbird

Penguin

We are "silly" birds playing a trick. Circle our part that does not fit!



Duckling

Now name each bird and draw a line to every "missing" part you find.

Feather My Nest!

Feathers Long

feathers short

fluffy feathers, too....

Birds have many feathers.
Each has a job to do.

See mother mallard's downy breast.
Those soft white feathers fill my nest. And downy feathers soft and warm, covered my body when I was born.

You, too, can use the warmth of "down" when chilly winter comes around.

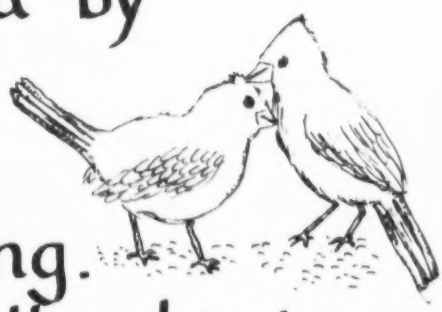
Look at the pictures going round.
Some can be filled with feather
down. If you think that they can
be, draw a line from them to me!

Preening-Cleaning

Birds' Housekeeping

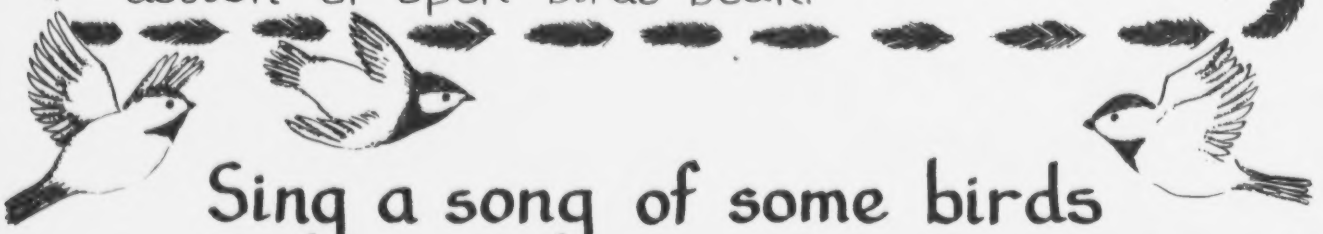
Since feathers get dirty and hide insects, too, birds clean them each day. Here's what they do.... With their beaks as a tool, they "zip up" long feathers, sometimes rubbing on oil to keep dry in wet weather.

Head or "crown" feathers get scratched with their feet, or can even be cleaned by another bird's beak. Whatever the way, feathers get cleaning. Because it's done by the birds, you may call it "preening."

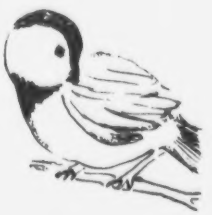


SCIENCE SAMPLER: To understand how some birds preen feathers using their opened beaks as cleaning tools....

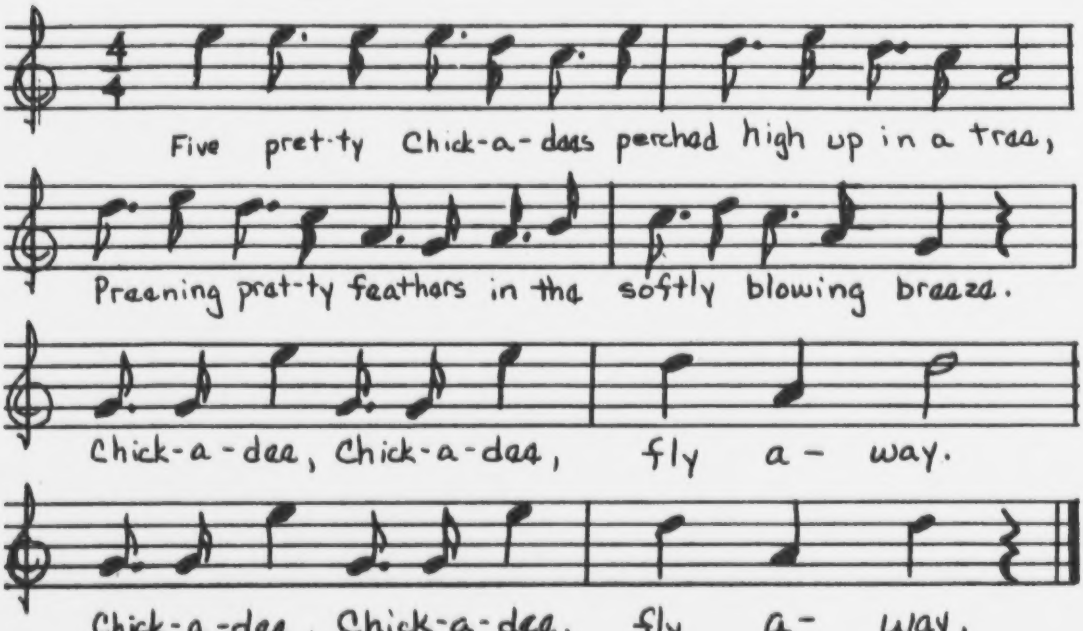
1. Find a feather with a firm center shaft.
2. Hold shaft in one hand, while passing the edges of the feather between the thumb and forefinger.
3. Feather will "zip up" imitating preening action of open bird's beak.



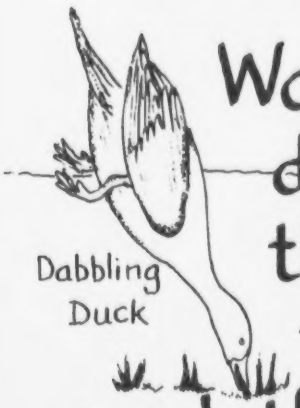
Sing a song of some birds
who stay the year round.
They wear caps on their heads
and can hang upside down.



"5 Pretty Chickadees"


Five pret-ty Chick-a-dees perched high up in a tree,
Preening pret-ty feathers in the softly blowing breeze.
Chick-a-dee, Chick-a-dee, fly a-way.
Chick-a-dee, Chick-a-dee, fly a-way.

Beaks and Feet



Water divers and dabblers will use their webbed feet to paddle or swim after good things to eat. Their beaks will be longer if seafood's their dish, for catching or spearing fast swimming fish! Woodpeckers cling to the trunks of tall trees. Two toes, front and back, help them do this with ease.

With a tough, pointed beak "punching" holes like a drill, they search for tree insects until they have their fill. Fast-flying hummingbirds have long narrow beaks for sipping sweet flowers, their favorite treat.

Some birds "perch" on branches. They need "perching" feet...three toes curled in front, plus one underneath. If they eat seeds and berries, their beak's short and thick, may even have notches for the "nutcracker" trick.

SCIENCE SAMPLER: To understand how a bird's notched hard beak can crack a nutshell or seed covering. (1) Have children examine metal nutcracker. Note hard metal and notched edge for holding nut. (2) Place nut inside and crack by forcing handles together. Relate to bird's strong, two-sided beak.

The eagle and owl really like to eat meat, so their toes, long and sharp, help them "catch" things to eat. Their tough, pointed beak often has a hook shape, for eating small creatures like field mice and snakes.

CIRCLING COLORING CUES: webbed feet = orange; clinging feet = black; perching feet = brown; catching feet = yellow; fishing beak = yellow; punching beak = red; sipping beak = black; nutcracker beak = orange; hooked beak = brown

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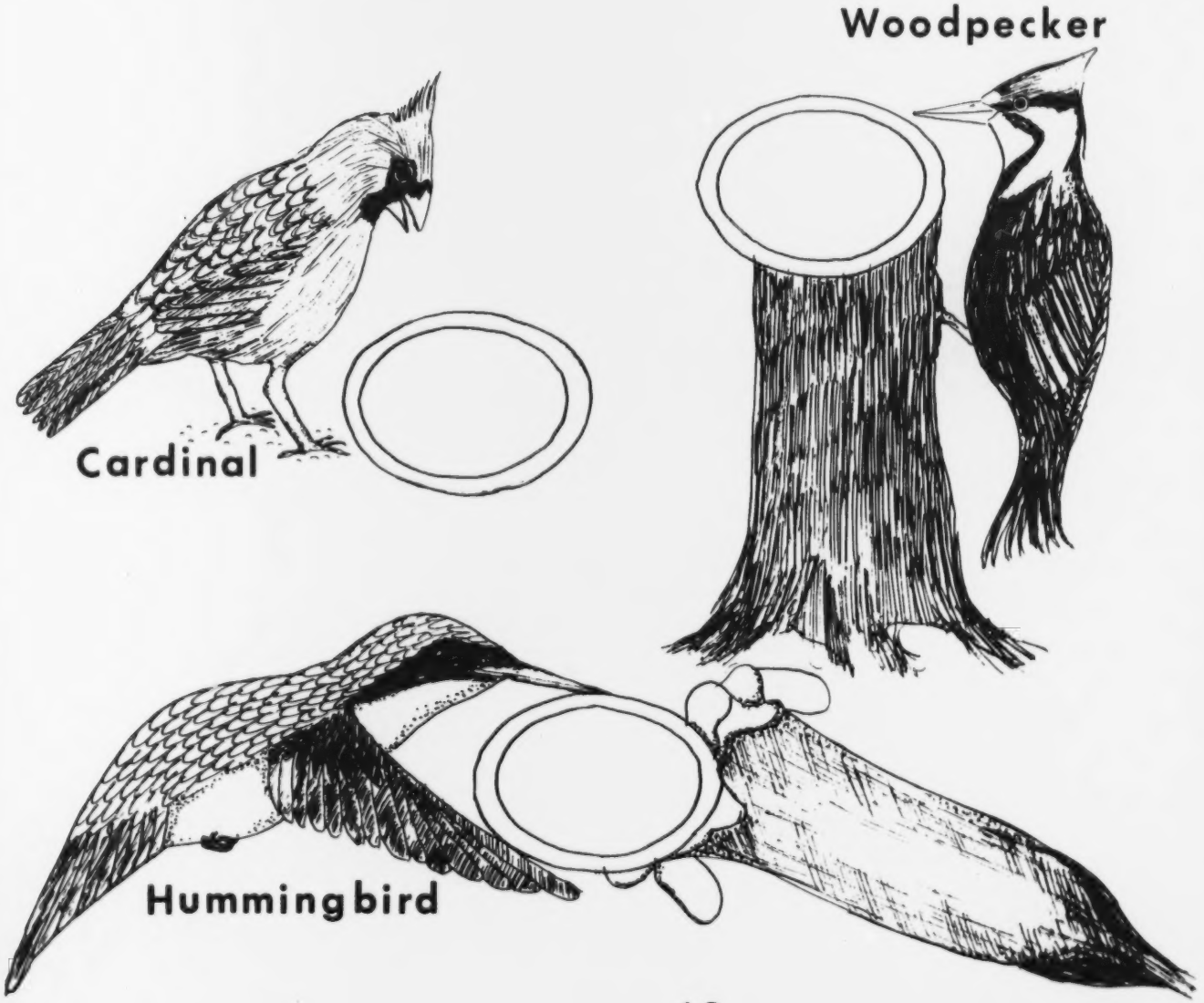
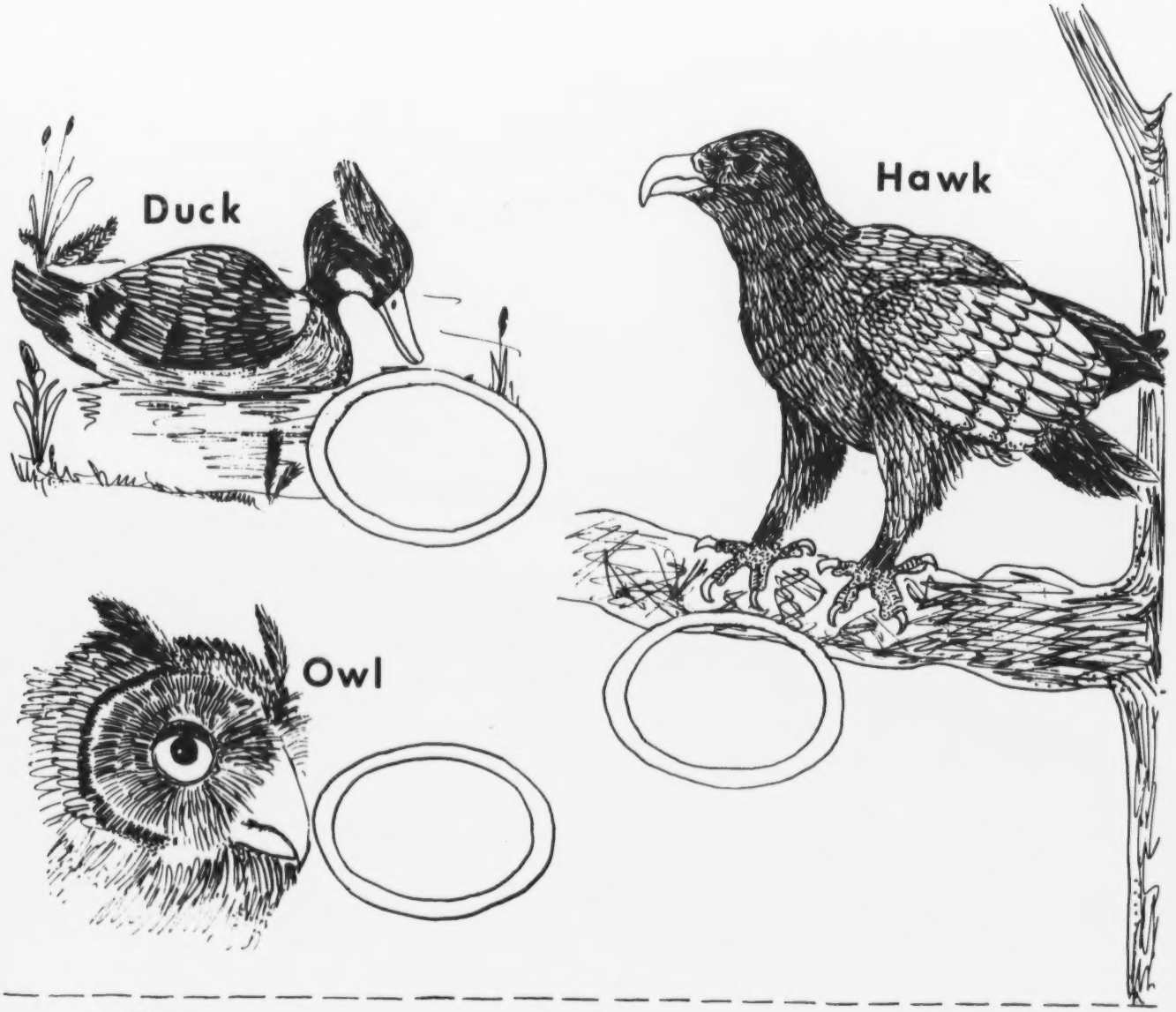
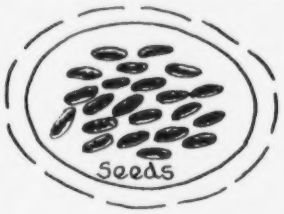
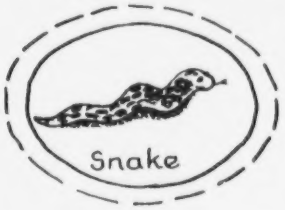
What's for Dinner?

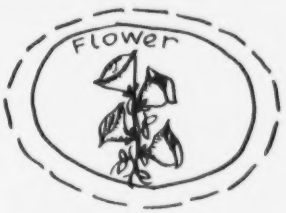
Look at these birds. See their beaks and their feet. Can you cut out the food they might like to eat?



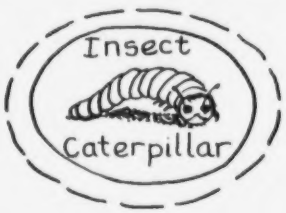

Duck
Hawk
Owl

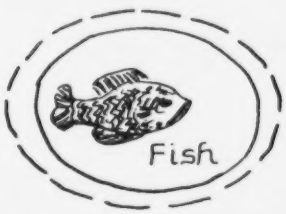

Seeds


Snake


Flower

Mouse


Insect
Caterpillar


Fish

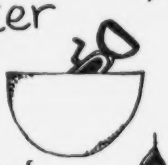
17

Waterproof Feathers

Spending time in water can wrinkle up your skin. My "oily" **feathers** help me out, since I really like to swim!

SCIENCE SAMPLER "A": To understand how oil protects a water bird's feathers.

1.) Add a few drops of yellow corn oil (or the colored oil used for dyeing Easter eggs) to clear water in a plastic bowl. 2.) Stir vigorously or mix with a hand-turned beater.



3.) Notice the oil droplets return to the surface and cannot be mixed or "dissolved" in the water.

SCIENCE SAMPLER "B": (See "A" above)

1.) Cut two squares of construction paper.
2.) Rub both sides of one square with vegetable oil.
3.) Add a few drops of water to center of oiled square, as well as unoiled square.

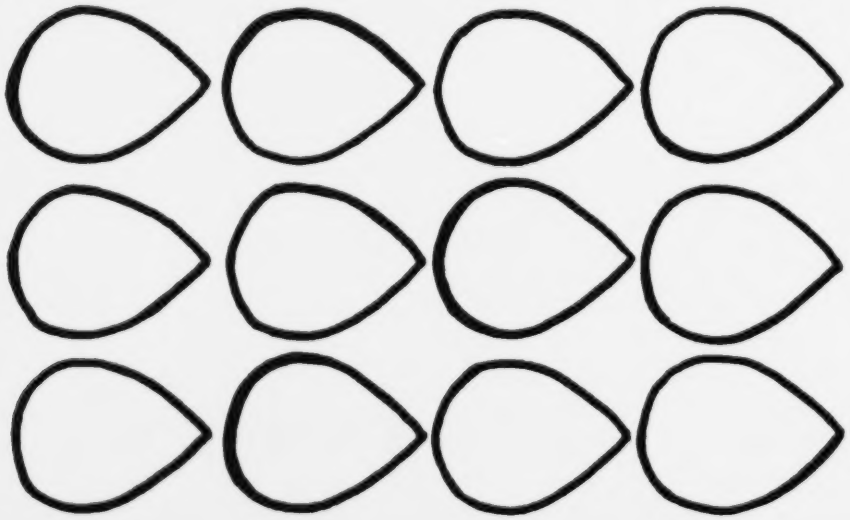
4.) Notice the unoiled square soon soaks up, "absorbs" the water droplets, while water remains "beaded" on the oiled square. Note: White or manila construction paper is very effective, if used with colored water droplets.

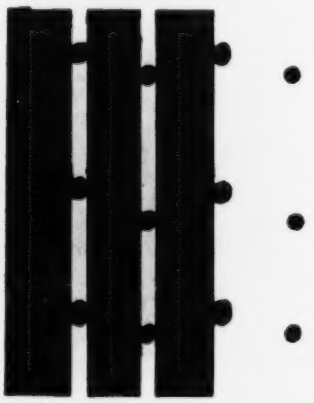
Scales and Skin

Many fish that live in water might be wrinkled all the time, if not for their skin covering, special "scales" all in a line. Now scales have rounded edges when they're lined up on the skin and "overlap" each other, so the water can't get in.

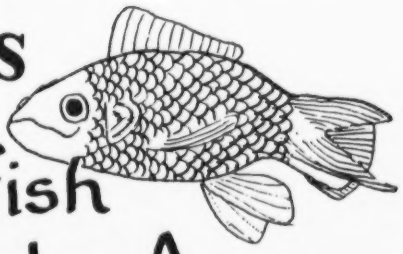
SCIENCE SAMPLER: To understand how "overlapping" rounded scales completely cover fish skin.

1. Cut out 12 scales. 2. Arrange in rows of three on lines as indicated. 3. As scales are overlapped, notice how the dark area, "fish skin," is completely covered.





Fishkeeping Facts



You can learn about fish if you have them as pets. A goldfish and bowl is all you need get. Fill the bowl with "tap" water. Let it stand for one day, then that cleaner "chlorine" won't get in the way. For to have healthy fish and keep them well treated, clear water and fish food is all that is needed.

One thing you must watch should pet fish come your way. They will need little food just "a pinch" everyday! But never a lot of fish food, for you know, it can make fish quite sick which won't help them grow.

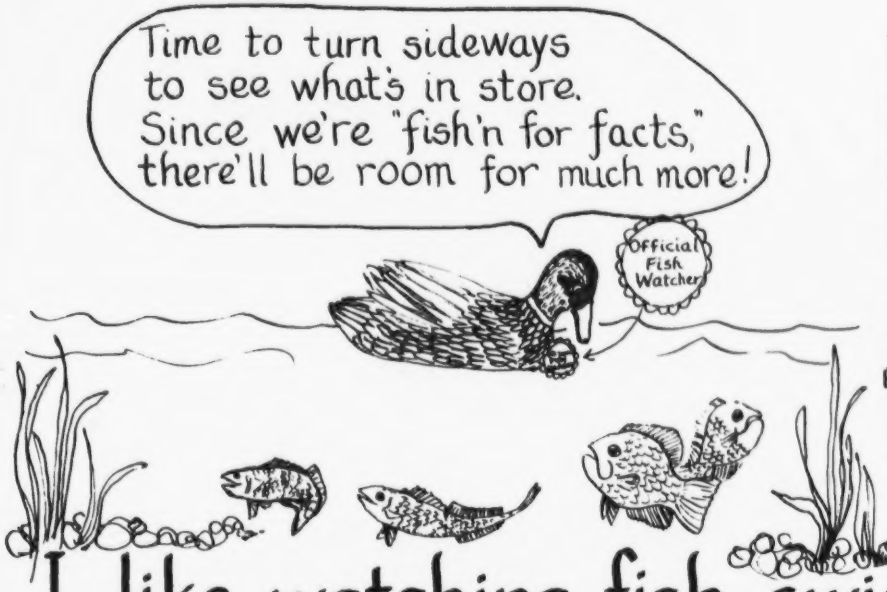
Just a Pinch Please!

Just mark this fish record of weekly fish feedings, on the day that you give them "the pinch" they are needing.

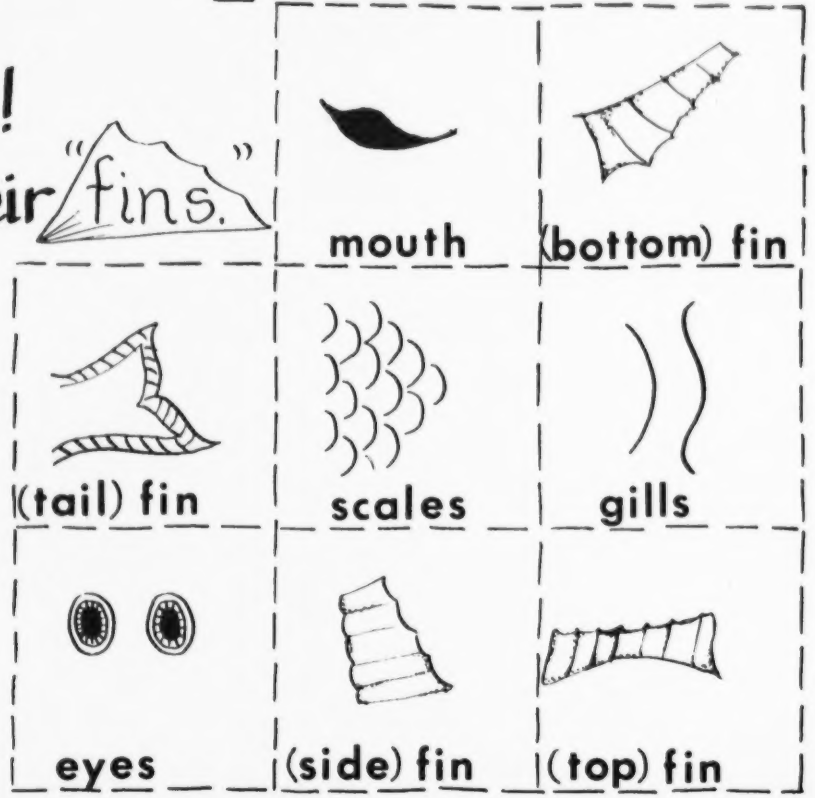
Directions for fish-feeding record:

1.) Fish may be cut out and glued to lightweight cardboard.
2.) Cover with clear Con-Tact paper.
3.) Children color appropriate scale after feeding fish.
4.) Erase scale markings with paper towel and begin again the following week.

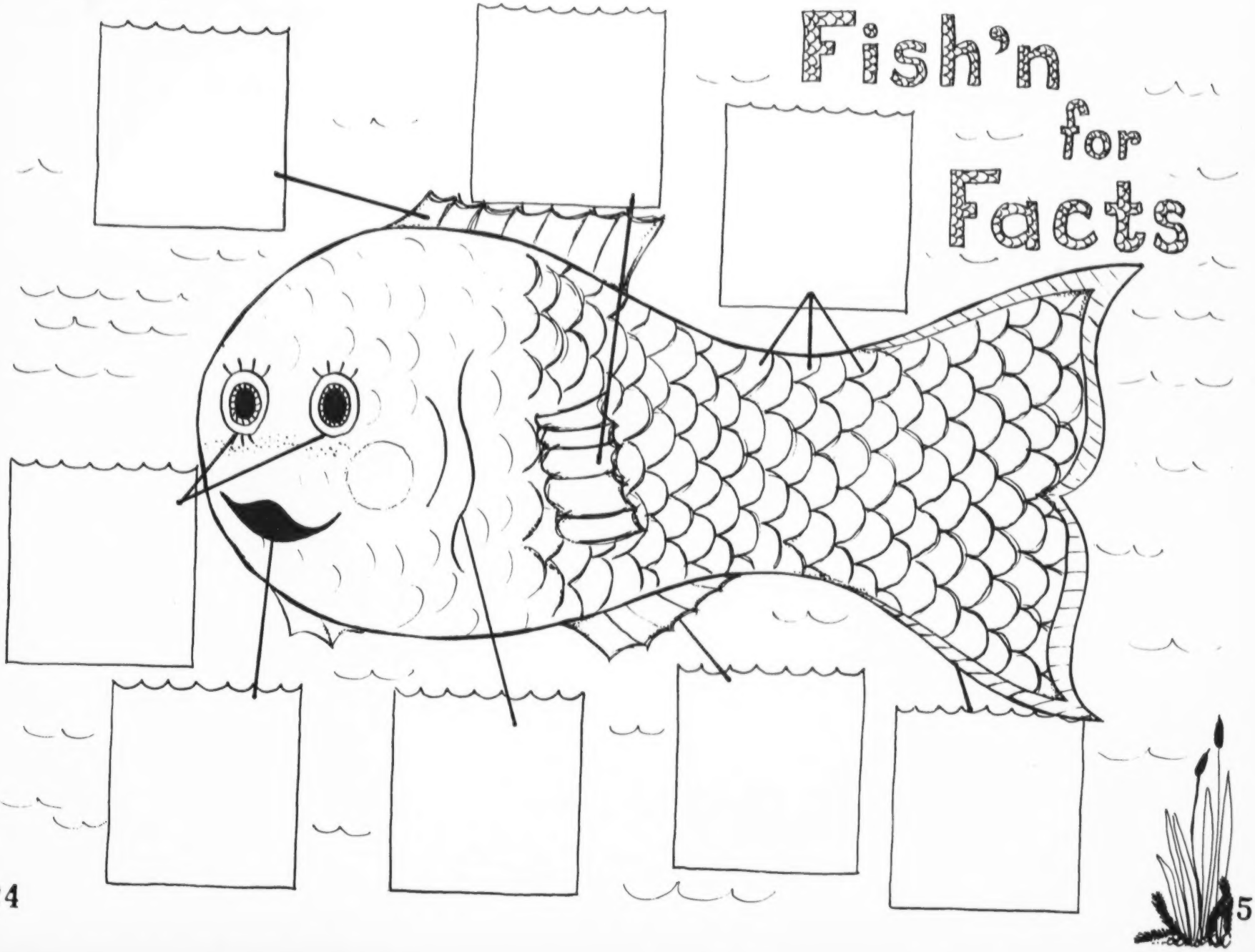
Fish 'n for Facts


Time to turn sideways
to see what's in store.
Since we're "fish'n for facts,"
there'll be room for much more!
Official Fish Watcher

I like watching fish swim!
Fish can steer with their "fins."
Have you seen the "scales"
lined up on their skins?
Fish "gills" used for breathing
look like "flaps" near their
eyes. They work well in
water but not otherwise.

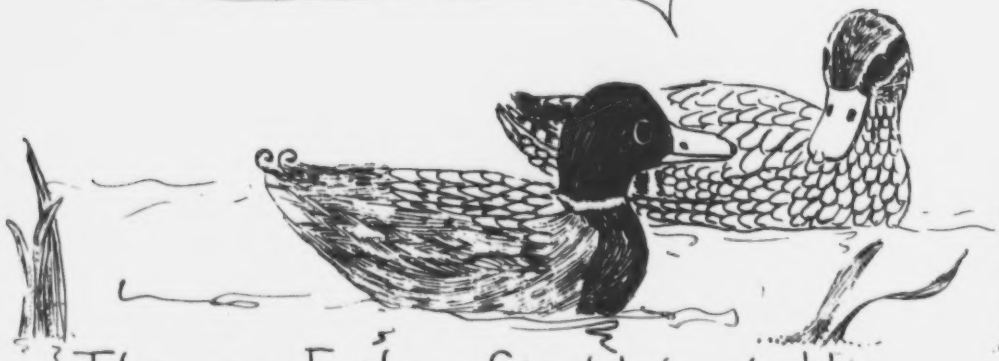


Fish'n for Facts

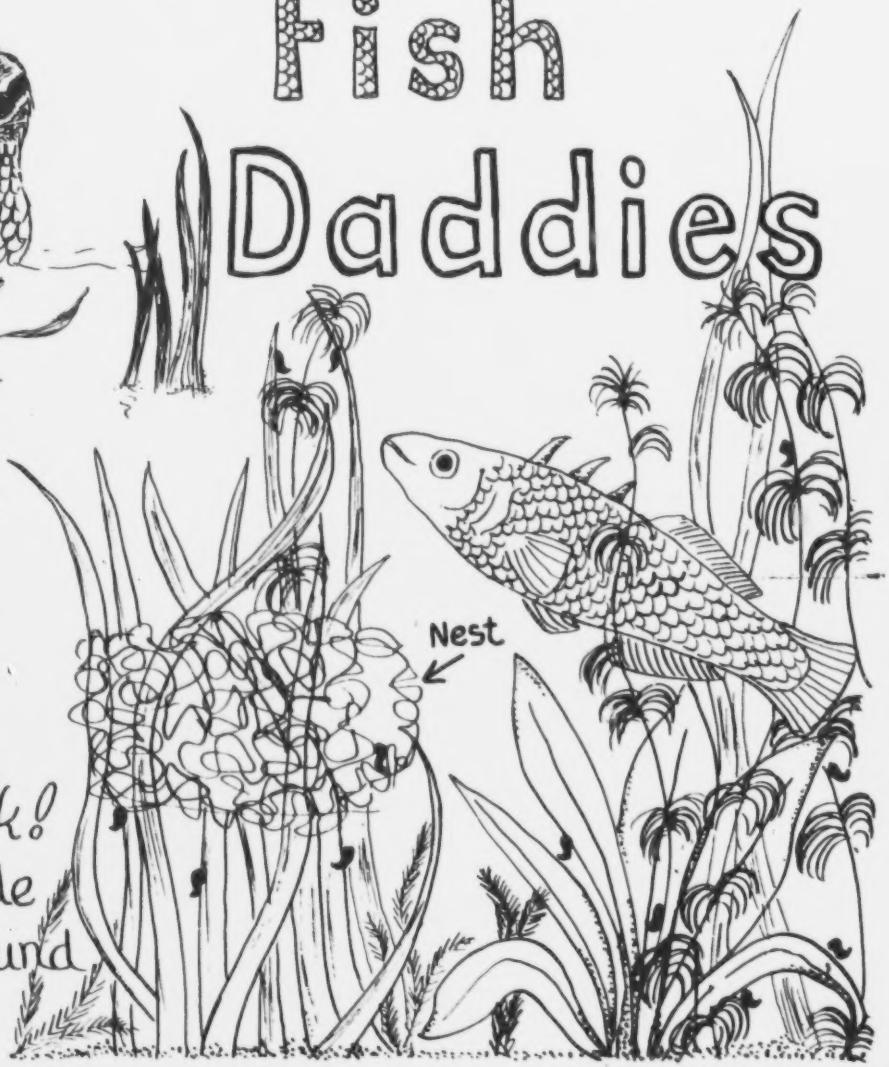


Dandy Fish Daddies

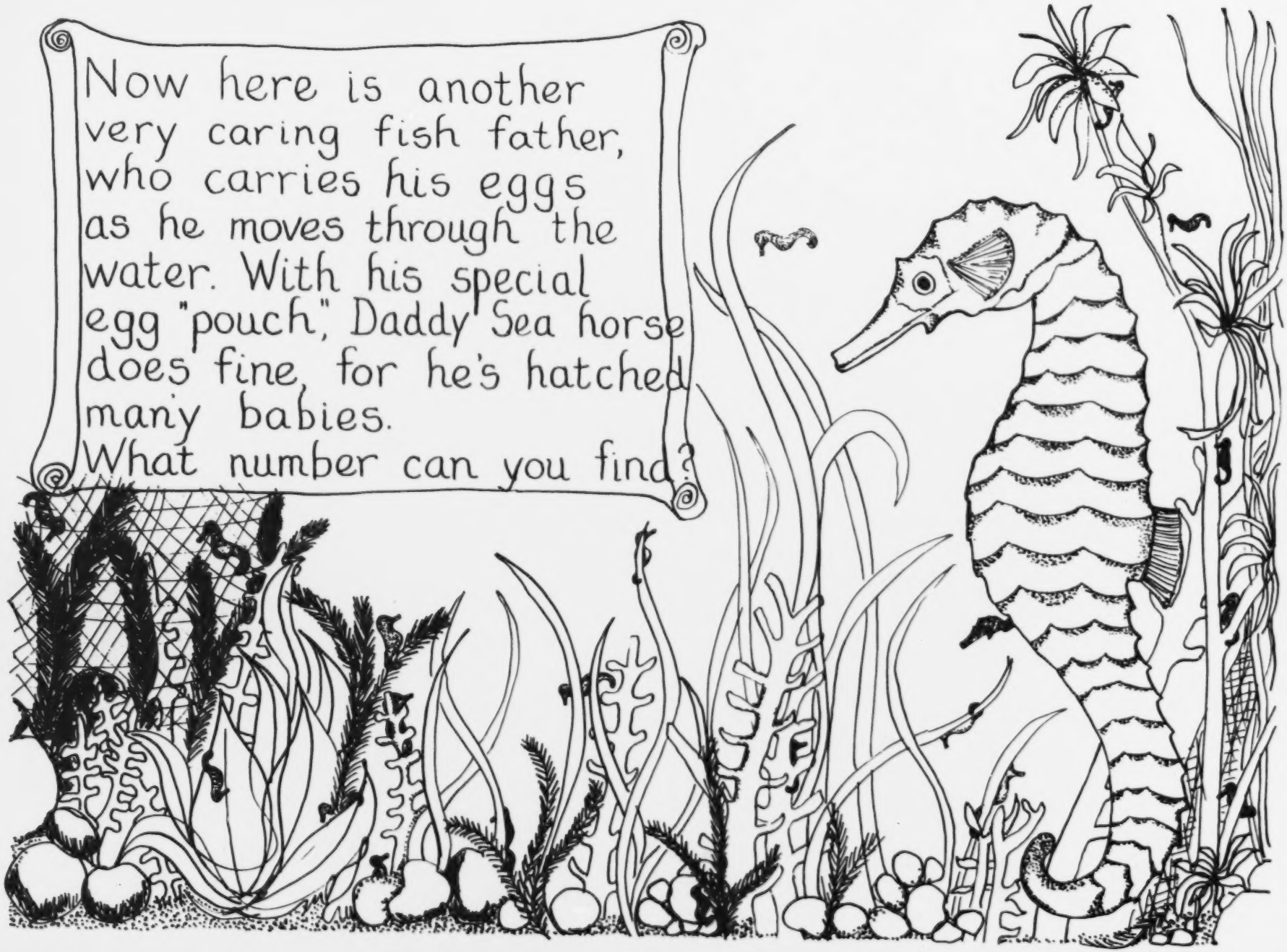
All the while I've been growing my mother's been there. But for some tiny fish, it's their fathers who care.



This is Father Stickleback. He made this nice nest. His mate just lays eggs there, then he does the rest. He fans them and watches for enemies, too. And when they have hatched, he has more things to do. *Look!* His fish "fries" are feeding outside of their nest. Father fish has found two. Can you find the rest?



Now here is another very caring fish father, who carries his eggs as he moves through the water. With his special egg "pouch", Daddy Sea horse does fine, for he's hatched many babies.
What number can you find?



Migrate?

Cold weather's almost here and now I'm fully grown. A warmer place to the SOUTH will be my winter home. Other birds will fly SOUTH, too. This move is called "migration". Birds that stay are sometimes seen at winter feeding stations. Birds eating seeds in winter and those who feed on meat, don't have to migrate, for they find just enough to eat.

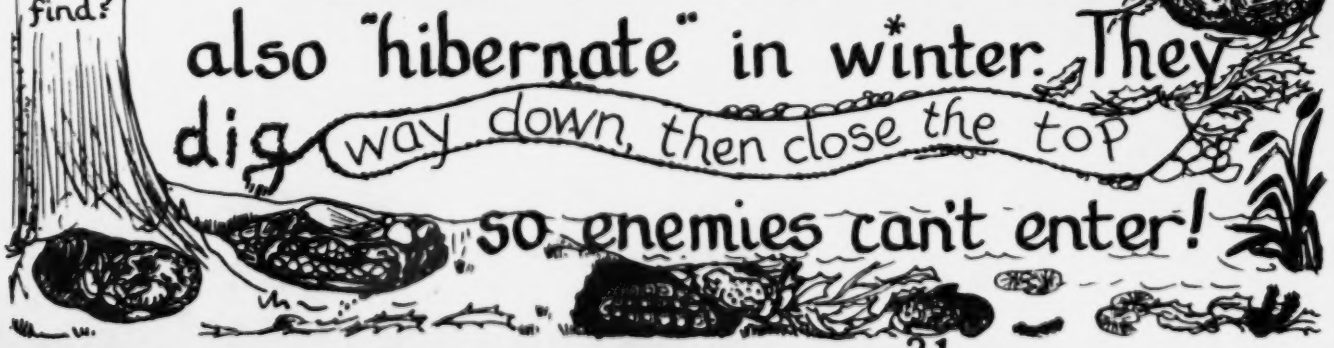
"Name the birds that stay over the winter. Is their favorite food seeds or meat? Check following page, too!"

Hibernate?

Some fish must also "migrate" before the cold sets in. They quickly move to warmer water but, of course, they swim. The fish that stay the winter do little, if anything, while other water animals simply hide until the spring. Turtles, frogs, and even fish will bury themselves and wait. They do not eat and hardly breathe, so we call this "hibernate!"

How many hibernators can you find?

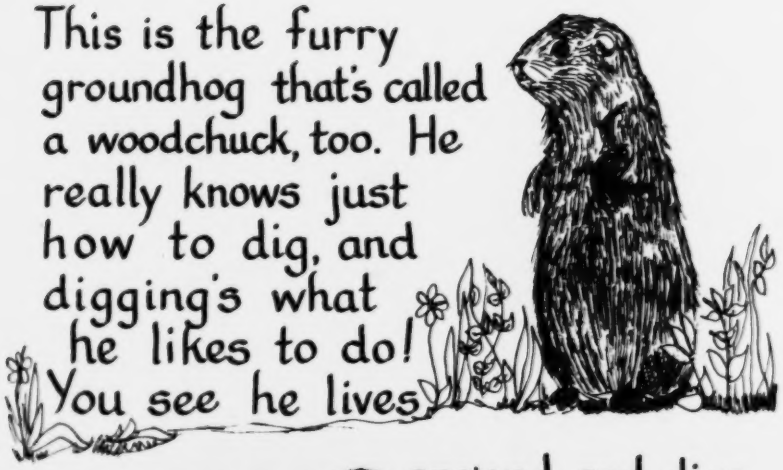
A number of land animals also "hibernate" in winter. They dig way down, then close the top so enemies can't enter!



A Famous Hibernator

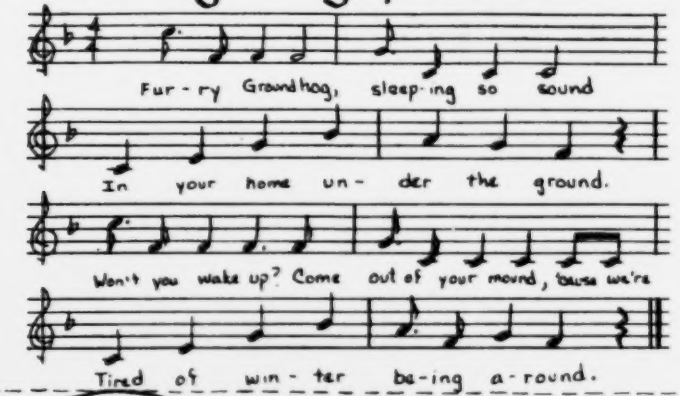
The Groundhog

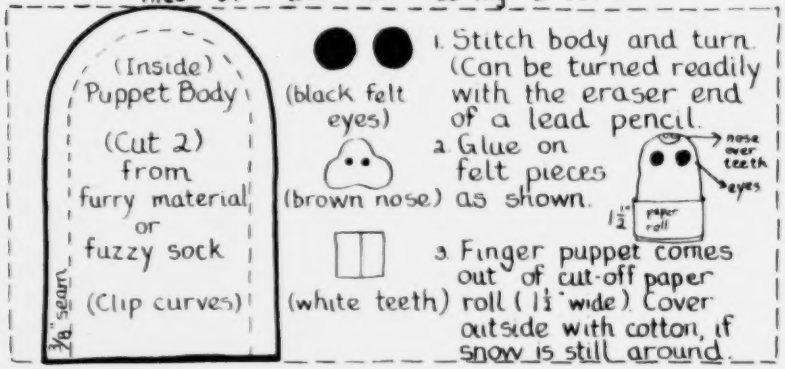
This is the furry groundhog that's called a woodchuck, too. He really knows just how to dig, and digging's what he likes to do! You see he lives



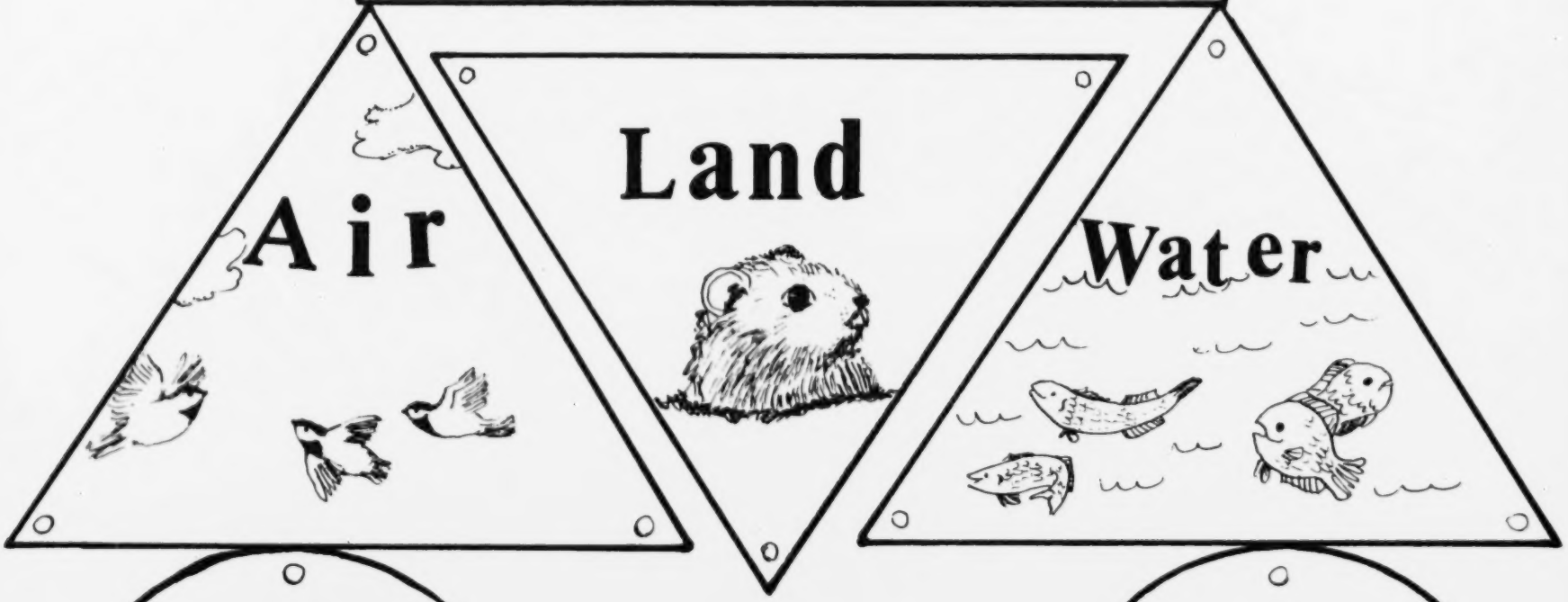
under the ground and digs a special den to hibernate the winter until warm spring begins. February 2nd is called our Groundhog Day. Should he wake up and stay awake, they say, "Spring's on the way!"

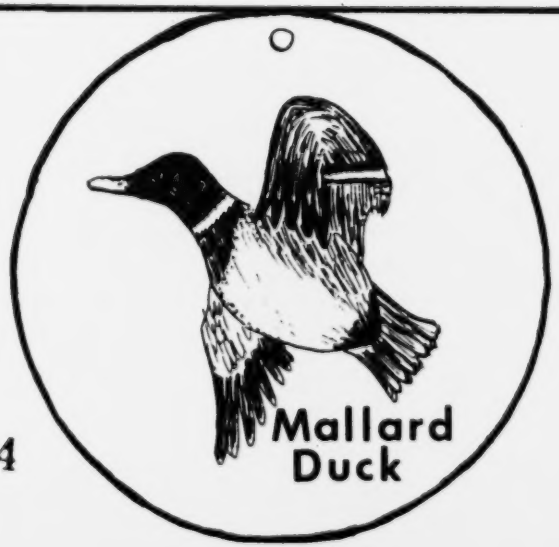
The weather still is very cold. This saying can't be true. Let's pretend that winter will end, sing the "Groundhog Song" please do!

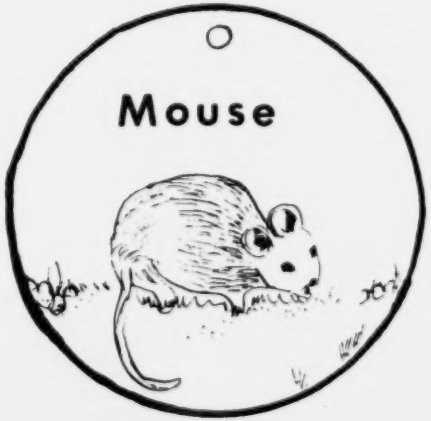

Fur - ry Groundhog, sleep - ing so sound
In your home un - der the ground.
Won't you wake up? Come out of your mound, 'cause we're
Tired of win - ter be - ing a - round.

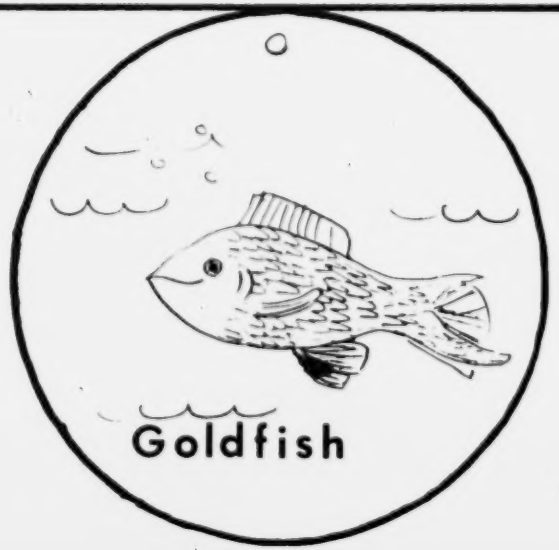

(Inside) Puppet Body
(Cut 2) from furry material or fuzzy sock
(Clip curves)
1/8" seam
(black felt eyes)
(brown nose)
(white teeth)
1. Stitch body and turn. (Can be turned readily with the eraser end of a lead pencil.
2. Glue on felt pieces as shown.
3. Finger puppet comes out of cut-off paper roll (1½" wide) Cover outside with cotton, if snow is still around.
nose over teeth
eyes
1½"
paper roll

Mov'n On

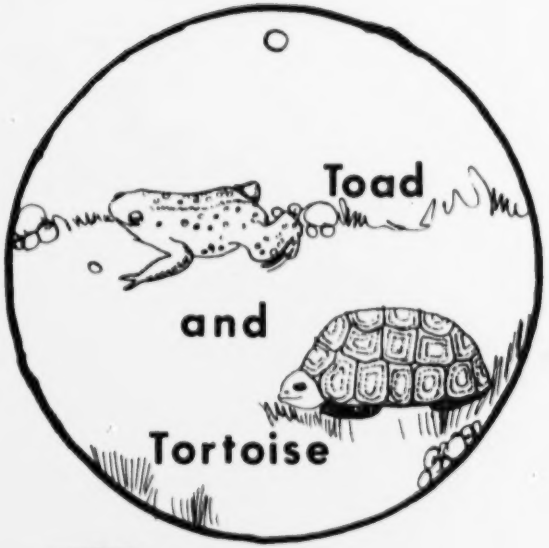








Groundhog

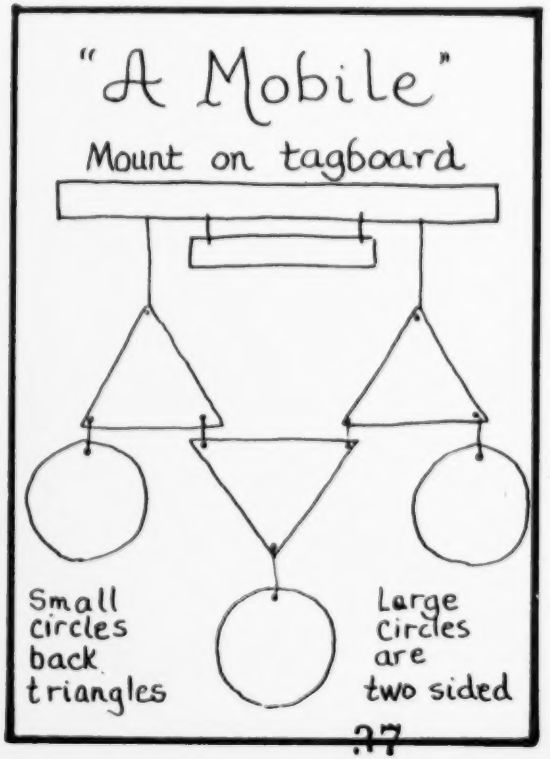

Toad
and
Tortoise

Stickleback

Sea horse

Eagle

Hummingbird


"A Mobile"
Mount on tagboard
Small circles back triangles
Large circles are two sided

Mig
Goo
Mallard"
le Duck
d-byes!
gration
"Malcolm
Mc
Quack! Quack!

TEACHER/PARENT GUIDE

"LITTLE MAC" MALLARD DUCKLING (p.1)

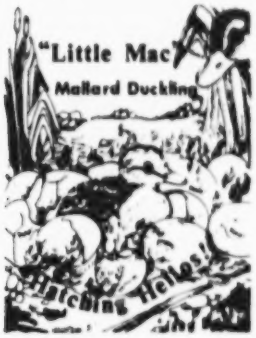
DISCUSSION: Are the children aware that baby birds hatch from eggs? Have them name some baby birds they have seen (i.e., chicks, ducklings, robins). Ducklings actually answer their mother duck's "quack" with a "peep," even before they hatch. When they are ready, almost all baby birds use "egg teeth" to peck their way out of the eggshells. (After assembling the duckling puzzle described below, look for the "egg tooth.")

LEARNING ACTIVITY: A picture puzzle of a newly hatched mallard duckling in a feather-filled nest, begins the activity pages. The duckling's name is Little Mac. Look for his picture as he "grows" throughout the book. Little Mac will be the children's guide to interesting animal facts.

Every child can make a "Little Mac" cover for his own **Air, Land, & Water Life** book. The pieces of the puzzle should be carefully cut out along the broken lines, assembled, and then glued to lightweight cardboard. The back cover puzzle on page 27, a grown-up Little Mac, may also be completed at this time. By taping the front cover to the back, each child can have a folder to hold the remaining activity sheets as they are completed.

Answer Key:

Front Cover Puzzle



Back Cover Puzzle

VOCABULARY: duckling, mallard duck, bird egg, hatch, egg tooth, eggshell, feather-filled nest

COME FOLLOW ME (p.2)

DISCUSSION: Perhaps the children have seen ducklings following closely behind their mother on land or swimming right behind her in the water. Ducklings and many other baby birds act this way because they are trying to learn how to "survive" (continue living) from their mother. She becomes a leader or model to follow and her actions are "imitated" perfectly by the little ducks. This way of learning is called "patterning." (Have the children ever used a pattern to trace around?) Discuss some of the things a mother duck would want her babies to learn (i.e., how to find food like insects, water plants, fish; how to watch for enemies on land or in the water).

LEARNING ACTIVITY: Let's play "Patterning!" Choose a girl to be the mother duck and ten children to be mallard ducklings. (This can be done on a one-to-one basis with the adult "model" and the child "duckling.") The ducklings must try to closely imitate mother mallard's actions. Meaningful duckling activities should be encouraged, such as ways of finding food. Many actions are acceptable, i.e., running, swimming, hiding and sleeping under mother's wings, etc. Any "duckling" forgetting to follow mother duck's pattern does not "survive" and must sit down. Try another duckling team with a new leader. Which team had the most survivors?

VOCABULARY: survive, model, imitate, patterning

FEATHERED FRIEND FILL-IN (p.3)

DISCUSSION: Animals belonging to the bird family have a special body covering. What is it? An animal with "feathers" has to be a bird. Birds may have two wings for flying, but a few birds with wings cannot fly. What is the name of a farm bird that does not fly? (chicken) How do birds move when not flying? (two feet) Where on your head do you find your eyes? (front, side or back) Where are a bird's eyes usually found? (side) Name a bird that has eyes placed in front of its head? (owl) What do we call a bird's mouth? (beak or bill)

LEARNING ACTIVITY: Children fill in the blanks with the picture word that best fits.

Answer Key: feathered, birds, wings, feet, eyes, beak

VOCABULARY: feathers, wings, penguin, owl, beak or bill

PUZZLING PARTS ?? (p.4)

DISCUSSION: An owl likes to eat meat. Would a long pointed beak help a meat eater? The hummingbird feeds on sweet nectar deep inside flowers. What kind of beak does it need? The eagle sometimes builds its nest on a mountain and has wings with many long feathers to fly very high. Would large feathered wings help a penguin move quickly after fish in the water? A duck must swim to find its food, while a woodpecker holds onto the trunks of trees to look for insects. Which of these two birds would need paddling feet?

LEARNING ACTIVITY: After the above discussion, the child may circle the bird body part that does not fit. A line can then be drawn to the bird with the part that is needed.

Answer Key:
Circle and draw line between:
(1) owl's and hummingbird's beaks
(2) eagle's and penguin's wings, and
(3) woodpecker's and duckling's feet.

VOCABULARY: hummingbird, sweet flower nectar, eagle, penguin and woodpecker

FEATHER MY NEST! (p.5)

DISCUSSION: Feathers, the all-important body covering of birds, come in several shapes and sizes. This is because different types of feathers may be used by the birds for different things. Have the children describe any feathers they may have found (i.e., soft, stiff, long, short). If the bird is large and a strong flyer, would he need long feathers in his wings? Short, fluffy feathers called "down" cover a baby bird's body and are also found on a mother bird's breast, just below her head. How might "downy" feathers help a baby bird, and why would a mother bird pull them from her breast to fill her nest? (warmth) Have the children used clothing or bedding that was filled with "down" for warmth and softness? (i.e., down pillows, down vests)

LEARNING ACTIVITY: If any of the children have down-filled outer clothing, it would be helpful to have them show their classmates. How does it feel to wear this clothing in winter compared to other types of winter clothes? (i.e., lightweight but warm)
Each child may draw a line from any of the articles pictured to Little Mac's circle, if he thinks it can be filled with feather down. Can the children describe how each article is used? How would filling it with down make it better?

Answer Key: The **shoes, dress** and **socks** are the only articles that would not be filled with down.

VOCABULARY: downy feathers, breast

PREENING - CLEANING (p.7)

DISCUSSION: Birds must clean their feathers everyday or they would become very uncomfortable and "itchy," because insects like to hide in dirty feathers. Can the children name some animal pets that use their tongues for cleaning their fur? (i.e., cats, dogs, rabbits, hamsters) What insect sometimes hides in a dog's fur coat? (flea) Keeping their feathers or fur coats clean is good for animals and actually helps them stay healthy by supplying a vitamin they need. This is how vitamin D is made. Birds add oil to their feathers as they clean them, and other animals have oil already in their fur. After the animal spends some time in sunlight, the oil makes vitamin D. When the feathers are cleaned by the bird's beak or the fur by the animal's tongue, they both get their sunshine vitamin. Have the children noticed the shine in an animal's fur? That "shine" comes from oil and is a sign of good health. (By rubbing baby oil on their skin, the children will notice the "shine" produced by oil.)
There are two other ways that birds keep insects out of their feathers. Birds bathe in water and sometimes even take a dust bath. Because an insect breathes through openings in the side of its body, the dust will clog or fill these openings. The insect cannot breathe, so it dies. Large jungle animals like the elephant also take dust baths to get rid of biting insects.

LEARNING ACTIVITY: If any child has a cat, he might want to tell how his pet cleans its fur. Does the cat like to sit in the sun? How does its fur coat look?
A bird uses its beak to clean most feathers by running the opened beak along the feather's edge. Feathers zip and unzip. This action gets out the dust and insects. Have the children try zipping and unzipping a real feather as suggested in the "Science Sampler."

VOCABULARY: preening, uncomfortable, insects, fur coat, flea, vitamin D, zip, unzip, feather edge

BEAKS AND FEET (p.9)

DISCUSSION: Birds eat at least ten times a day, but usually more. How many times a day do the children eat? Because they must spend so much time eating, birds' beaks and feet are very important to survival.

LEARNING ACTIVITY: Water birds usually feed on fish and small water animals, as well as water plants. That is why the toes on their feet are joined together by a piece of skin, forming a small paddle. These "webbed" feet help them move or swim through the water after food. (Draw a picture of a boat oar for the children. Discuss how the paddle on the boat oar pushes water away to move the boat.)
How do people hold the fingers on their hand when swimming? (Demonstrate with hand slightly cupped and fingers together.) Does this remind the children of a paddle? Suggest they try making a "hand paddle."
To "dabble" (tip over for feeding) or "dive" after fish, a water bird needs a long beak (bill) to reach or catch its food. Suggest the children look for pictures of water birds at the library and share these with the class. Talk about their beaks and webbed feet.
How would a child climb a pole sticking straight out of the ground? (Answer = shinny, gripping with two arms above the two legs below.) This is the idea behind the toes on a woodpecker's foot. Since this bird must climb along the straight up and down trunk of a tree, two toes, front and back with sharp nails, help the woodpecker do this easily. Holes are made in the tree by hitting the wood with a hard pointed beak. After the hole is made, the woodpecker reaches in to grab an insect. (Holes can be pounded or drilled in a piece of wood. Let the children feel the hard surface of the nail or drill bit.)
For understanding how birds use perching feet to firmly hold onto a tree branch while eating seeds or berries, obtain a paper roll cylinder 1" or less in diameter and 6" long. Place fingers of both hands in "perching position" around the cylinder, three over the top and thumb underneath. Lock thumb over middle finger, if possible. Have someone attempt to pull cylinder away. Let the children try this with a partner. (Use the "Science Sampler" to understand the beaks of seed eaters.)
Look at the "catching feet" (talons) of an owl or eagle, with their long sharp nails. Why would these work well for birds that eat small animals?
To understand the hook-shaped beak of these meat eaters, obtain an empty metal pop can and a flat, as well as hooked bottle opener. Turn the can over to the unopened end. Which opener, flat or hooked, will make a hole in the can more easily? Now let a child try using both openers. Would a hooked beak be better for making a hole in tough snake skin?

Answer Key:

Birds beaks and feet circled with these colors.		
duck's feet	=	orange
duck's beak	=	yellow
woodpecker's feet	=	black
woodpecker's beak	=	red
hummingbird's beak	=	black
(p. 10 top) perching feet	=	brown
seed beak	=	orange
eagle's or owl's foot	=	yellow
eagle's beak	=	brown

VOCABULARY: divers, dabblers, webbed feet, seafood, spearing, drill, sipping, seed notches, hooked, field mice.

WHAT'S FOR DINNER? (p.11)

DISCUSSION: Review the type of beak and feet on each bird pictured.

LEARNING ACTIVITY: Cut out food pictures on broken lines. Glue picture of favorite food by each bird.

Answer Key:

cardinal	=	seeds
woodpecker	=	insect
hummingbird	=	flowers
duck	=	fish
hawk	=	snake or mouse
owl	=	snake or mouse

A field trip to a zoo aviary would be a worthwhile science adventure at this point and reinforcement for the newly learned information on birds.

VOCABULARY: cardinal, hawk.

WATERPROOF FEATHERS (p.13)

DISCUSSION: What happens to the children's skin, if they are in bath water a long time? Water birds need to protect their feathers and skin from becoming soaked and wrinkled. They do this by putting a special oil on their feathers. (**Preening - Cleaning**, page 7)

LEARNING ACTIVITY: "Science Samplers" A and B will help the children come to the realization that since oil and water will not mix, oil can be waterproof protection for the feathers of birds.

VOCABULARY: protect, waterproof, soaked, wrinkled, droplets, mix, dissolve, beaded, absorb

SCALES AND SKIN (p.14)

DISCUSSION: Fish living in water also need a special covering on their skin. This covering is called "scales." Scales are lined up in straight rows on fish skin, with one row half covering the row in front of it. This "overlapping" of scales keeps the fish skin completely protected. Have the children noticed "overlapping" in any other animal we have met in this book? (bird with feathers)

LEARNING ACTIVITY: Have the children try the "Science Sampler" to understand the covering pattern of overlapping scales. Cut scales carefully on the outside line. Line up on strips of black "fish skin" by placing point of scale on dots. Finish one row at a time, working left to right.

Scales are made of thin pieces of bone that become larger as the fish grows. If you could look at a scale from a large fish with a magnifying glass, you might see rings inside the scale. The rings could look like this:

Counting the rings will tell you how old the fish is. Each ring is smaller at one end and larger at the other end. This is because a fish hardly grows at all in the winter and does most of its growing in the summer. Which part of the scale ring (picture) grew in the summer? (wide end) Which part grew in the winter? (narrow end) Looking at this scale, how old would the fish be? (five years old)

VOCABULARY: scales, straight rows, rounded, half covering, overlap, completely, thin, bone, magnify, rings

FISHKEEPING FACTS (p.15)

DISCUSSION: A goldfish will have added interest as a pet, while children are learning about fish. There are really two things that keep pet goldfish healthy. The first is clean, clear water in a bowl, and the second is a little fish food each day.

Let's first talk about the water. Have the children heard of "chlorine" in water, and do they know why it is used? Chlorine helps make water from the faucet (tap water) clean and safe for us to drink. It also keeps swimming pools clean in summer. Fish, however, cannot have chlorine in their water or it will make them sick. We can remove chlorine from tap water rather easily, by letting it stand in an opened container for one day or by "boiling" the water. What does boiling water look like?

LEARNING ACTIVITY: If it can be done safely, the children can benefit from observing the boiling water method of removing chlorine. The water should be measured before heating. Heat to a rolling boil, causing "steam vapor" in the air which can be easily seen by the children. Capture some of the escaping "vapor" by covering the boiling water for a minute. After removing, let the cover cool. Then using a tissue, wipe inside the cover. Wring the tissue so the children can see the water that would have escaped as "steam vapor" into the air, if the cover had not stopped it. Now check to see if there is more or less water after boiling. Why? (Have any of the children had a "vaporizer" in their bedrooms when they were sick? How do they think this machine makes vapor?)

If water is left standing to remove chlorine, be sure to mark the waterline. Notice the waterline after one day has passed. Is there more or less water? Some of the water has escaped in "vapor." If a cover had been placed on the container, water drops would have been inside the cover. (Remember catching "steam vapor" by covering boiling water?) Now when water vapor escapes into the air, we

can say it "evaporates." (Write this new word so the children can find "vapor" hidden inside.) What happens to the water in a puddle on a sunny day?
The chlorine in tap water will evaporate, too, if the water is boiled or left standing a day. Then the water can be used for goldfish. The only other need pet fish have is food, and that must be given a little at a time. Once a day, just a "pinch" between the thumb and forefinger is all that is necessary. Have child demonstrate correct feeding.

VOCABULARY: goldfish, pet, tap water, chlorine, heat, boiling, steam, vapor, measure, vaporizer, waterline, vapor escapes, evaporates.

JUST A PINCH PLEASE! (p.16)

DISCUSSION: How many of the children have goldfish as pets? Do they have names for their fish? How do they care for them?

LEARNING ACTIVITY: Armed with all these "fish-keeping facts" you may want to try pet goldfish in your home or classroom, if you haven't already.
Do keep a record of the daily fish feeding. Record keeping is an excellent science practice and will encourage the children to properly care for their fish. Remember, too much food in the water can make the fish sick, and it robs the water of needed oxygen, as well as making it cloudy. Should this happen, the water must be changed. When goldfish "gulp" air near the surface, it is their way of saying, "Help, we need a change!"

VOCABULARY: record keeping, oxygen, gulp

FISH'N FOR FACTS (p.17)

DISCUSSION: Can the children name any fish parts? Do they know how these parts are used by the fish? Review the need for fish scales.
When a fish swims in the water he uses his flat body somewhat like a paddle, moving it back and forth to push the water out of the way. (Demonstrate a swimming fish body by holding one hand with fingers straight and closed; then move the hand in a wave-like motion.) Of course, when water is pushed away from something, it comes right back, and this water coming back helps the fish move even faster.

Fish fins, which are usually found on the top, bottom, side and in back (tail fin), are used mostly for steering and turning. Fish have large or small mouths, depending on the size of the food they like to eat. A fish has two eyes and in most fish these eyes are found on each side of its head. The breathing parts of a fish are found just behind its eyes. They are called gills and look like flaps of skin. Most living things must breathe oxygen. How do we get oxygen from the air? (i.e., breathing through our mouths and noses) After we breathe air in (inhale), our lungs remove the oxygen from the air. Have children take deep breaths and hold their hands on their rib cages to feel their lungs filling with the inhaled air. Now have them let the air out (exhale). A fish brings water in through its gills, and the gills take the oxygen the fish needs from the water.

LEARNING ACTIVITY: To understand how a fish uses its side fins for steering and balance, relate these fins to the handlebars on a two-wheeled bike. Pretend the bike handlebars are fins reaching out from both sides of a fish body. Have a child demonstrate how he uses the handlebars for balance and steering so the bike won't fall sideways while he pedals. The fish does the same thing with its side fins, moving them back and forth all the time to keep balance so the fish won't fall to one side or the other. (Observe a goldfish if you have one, to see that this is true.) When you are trying to walk on a narrow board with one foot directly in front of the other, how can your arms help? Which pair of fins on the fish act like your arms to help it keep balanced?
Have the children cut out the fish parts carefully along the broken lines. Each part should be glued in its proper square as indicated.

Answer Key: Clockwise beginning with eyes, top fin, side fin, scales, tail fins, bottom fin, gills, mouth.

VOCABULARY: flat body, fins, steer, gills, breathe, oxygen, inhale, lungs, exhale, balance, narrow

DANDY FISH DADDIES (p.19)

DISCUSSION: Some fish are looked after by their fathers until they can survive on their own. What do the children think fish fathers might do for their babies? (i.e., build a nest, scare away enemies, feed them)

LEARNING ACTIVITY: The father stickleback is a fine nest builder. After the mother lays eggs inside the nest, he takes charge and the mother swims away. He fertilizes the eggs so they will hatch, fans them with his tail fin to make more oxygen, and keeps all enemies away. When the fish "fries" (newly hatched fish) start feeding outside the nest, he watches for enemies and returns the "fries" to the nest with his mouth, if there are any problems. Circle all the fish "fries" for the father fish and draw a line from each back to the nest.

Answer Key: Circle "12" stickleback fish "fries."
The sea horse doesn't build a nest because he has a special pouch or pocket for eggs right in front of his body. The mother sea horse lays her eggs inside the father's pouch. Sometimes the father has problems staying upright, because there are so many eggs and his pouch is so heavy. When the babies hatch they leave their father's pouch one at a time. Pretty soon there are baby sea horses everywhere, holding onto water plants with their tiny tails. See how many hatched babies you can find.

Answer Key: There are "20" babies near the water plants and one just hatching from the father's pouch.

VOCABULARY: stickleback nest, fish fries, fertilizes, fans, sea horse, pouch, upright

MIGRATE ? (p.21)

DISCUSSION: After hatching in the spring, then eating and changing all summer long, Little Mac duckling has become a full-grown duck called Malcolm. Winter is coming, and it is time for Malcolm Mallard to fly South where it is warmer. Can the children name other birds that "migrate" to the South and are not seen in winter? Some birds will stay in the cold weather if they can find enough food.

LEARNING ACTIVITY: Find two meat-eating birds in the picture that will stay through winter. (Check pages 21 and 22.) Now find two seed eaters.

Answer Key: eagle and owl = meat eaters
chickadee and cardinal = seed eaters

Why not make a winter feeder for seed-eating birds? Cut a juice orange in half; squeeze it for drinking, and then scrape out the pulp. Spread the inside with peanut butter and sprinkle with bird seed. Insert pipe cleaner to hang from tree branch. (Shortening or lard may be substituted for peanut butter.)
Encourage children to watch winter feeders for "seed eaters" they might know. Have them share their bird-watching discoveries with classmates.

VOCABULARY: South, winter, spring, summer, migration, feeding station

HIBERNATE? (p.22)

DISCUSSION: Many fish migrate. Before the water becomes too cold, they must swim to warmer water or they will die. Fish who can survive the winter usually are very inactive. If fish stop eating altogether, bury themselves in mud or leaves near the bottom, while hardly even breathing, they are hibernators. Other water animals like frogs and turtles also hibernate by burying themselves in mud near the water's edge or on the bottom. Can the children name two animals that look almost like a frog or a turtle but do not live in the water? (toad and tortoise) These land animals always dig down in the ground and stay hidden until the weather warms. Other land animals that hibernate are snakes, and ground squirrels like chipmunks and woodchucks.

LEARNING ACTIVITY: Have the children look for buried hibernators in the picture. They can keep a tally on the tree trunk of those they find.

Answer Key: Ten hibernators.

VOCABULARY: inactive, bury, hibernate, frog, turtle, toad, tortoise, ground squirrel, chipmunk, woodchuck

A FAMOUS HIBERNATOR (p.23)

DISCUSSION: Have the children ever heard of Groundhog Day? This was a holiday celebrated in Europe in honor of a furry hibernator, the hedgehog. This little animal was also called the groundhog because of its habit of digging small rooms and tunnels under the ground. When settlers first came to America and saw the woodchuck, they thought he was a groundhog, too, and began celebrating Groundhog Day here. The settlers would say that the groundhog woke from hibernation on the second day in February. If he didn't see his shadow when he came out, the groundhog would remain awake and spring would be on the way. The woodchuck, however, would never wake from hibernation this early because the weather is still very cold; therefore, the old saying can't be true. We still celebrate Groundhog Day anyway, since everyone would like winter to end.

LEARNING ACTIVITY: Woodchucks are great diggers and sometimes have several underground rooms called "dens." When digging, the woodchuck brings up piles of dirt to form a small hill, or "mound," at the opening of its underground tunnel.
Now that the children understand the words, they can learn to sing the "Groundhog Song." It is fun to sing when everyone is feeling tired of winter.
The groundhog puppet on page 23 will also be a welcome wintertime project. The children will enjoy using their finger puppets in the paper roll mound while singing the "Groundhog Song."

VOCABULARY: hedgehog, groundhog, digging, den, mound

MOV'N ON AIR, LAND AND WATER (p.24)

DISCUSSION: Have the children name as many flying birds as they can from this book. Can they name three fish from the book? How about three land animals?

LEARNING ACTIVITY: Cut out the animal pictures and glue to cardboard circles and triangles. Complete the mobile by classifying the birds that fly in the air, fish that swim in the water, and animals that live on land. Arrange in a mobile as indicated on page 25.

Answer Key:

Air	=	eagle, hummingbird, mallard duck
Land	=	groundhog, mouse, toad and tortoise
Water	=	goldfish, stickleback, sea horse

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